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PROGRESS REPORT

BADGER WASH COOPERATIVE STUDY
PRECIPITATION, RUNOFF, AND SEDIMENT YIELD, 1965 SEASON

by

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Shown in the following tables are data on precipitation, runoff, and sediment yield obtained at the Badger Wash study area during 1965. A complete description of the study area and instrumentation installed may be obtained from USGS Water-Supply Paper 1532-B.

Precipitation amounts are shown in table 1. Average precipitation for the summer season measured at the 10 gages during 1965 was 8.14 inches which was 185 percent of the average for the previous 11 years. The largest storm of the year occurred on April 27 when an average of .93 inches was measured.

Total seasonal runoff and sediment yield measured at all reservoirs is shown in table 2 and runoff by storms in the 8 paired watersheds is shown in table 3.

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per 3, 1965).

[estimated from total catch or other records.]

Date	Watershed number								
	11	1A	1B	2A	2B	3A	3B	4A	4B
Apr.	(.05)	.05	.05	.03	.05	.17	.18	.04	.03
	(.05)	.06	.04	.01	.02	.35	.38	.01	.01
	.10	(0)	.05	.07	.06	.01	.04	.07	.09
	.10	.13	.13	.14	.12	.09	.10	.09	.10
	(.05)	.15	.18	.20	.15	.14	.15	.15	.17
	.10	0	0	0	0	.01	.01	0	0
	.20	.19	.21	.27	.25	.20	.21	.18	.19
	(.02)	.02	.02	.04	.01	.01	.02	.01	.02
	.20	.08	.14	.12	.08	.16	.17	.20	.22
	1	.10	.15	.15	.18	.17	.12	.11	.13
	1	.10	.04	.02	.03	.02	.02	0	.01
	1	.10	.16	.16	.22	.17	.14	.15	.16
	10	0	0	.01	.02	0	0	0	0
	10	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	.01
May	2	(.04)	.04	.05	.03	.05	.02	.04	.04
	2	1.20	.82	.80	.87	.90	.85	.89	.90
	0	.01	.01	.01	.02	.02	.02	0	0
	.20	.25	.27	.22	.24	.23	.24	.20	.21
	10	.17	.12	0	0	0	0	0	0
	1	.40	.22	.29	.41	.32	.33	.35	.36
	10	0	0	.01	.01	0	0	0	0
	2	.10	.06	.08	.06	.05	.06	.07	.09
	2	.50	.29	.34	.33	.40	.34	.37	.34
	2	.30	.17	.15	.11	.07	.16	.15	.13
June	1	.20	.11	.13	.17	.16	.16	.16	.12
	1	.10	.13	.14	.02	.03	.11	.11	.16
	10	0	0	.05	.07	0	0	0	0
	1	.20	.17	.18	.18	.17	.15	.16	.18
	1	.10	.04	.04	.06	.05	.04	.05	.06
	2	.20	.14	.15	.12	.13	.13	.14	.15
	20	0	0	0	0	0	0	0	0
	0	.19	.19	.09	.10	.17	.18	.03	.04
	1	.70	.50	.48	.48	.47	.35	.45	.46
	10	.07	.06	.06	.06	.05	.05	.01	.01
July	1	.70	.68	.78	.65	.57	.67	.69	.71
	10	0	.02	0	0	0	0	0	0
	1	(.05)	.05	.07	.07	.08	.16	.17	.09
	10	0	.01	0	0	0	0	0	0
	20	0	.01	0	0	0	0	0	0
	20	.02	.02	.01	.01	.02	.01	0	0
	2	.20	.24	.26	.21	.16	.26	.27	.24
	2	.10	.01	.03	0	0	0	0	0
	3	.10	.10	.12	.11	.10	.09	.10	.09

Table 1.--Precipitation, Badger Wash (April 1 to November 3, 1965)

[When numbers are shown in parentheses, no daily records obtained. Amounts estimated from total catch or other records.]

1965)--Continued

[from total catch or other records.]

Table 1.--Precipitation, Badger Wash (April 1 to November 3, 1965)--Continued

[When numbers are shown in parentheses, no daily records obtained. Amounts estimated from total catch or other records.]

Table 2.--Runoff and sediment yield at Badger Wash, 1965

Drainage basin	Drainage area (sq mi)	Runoff		Sediment	
		Acre-ft	Acre-ft per sq mile	Acre-ft	Acre-ft per sq mile
1-A	0.066	3.654	55.36	0.451	6.833
1-B	.084	2.542	30.26	.344	4.095
2-A	.148 ^{1/}	5.130	34.66	.331	2.236
2-B	.158	4.297	27.20	.300	1.899
3-A	.059	2.724	46.17	.442	7.492
3-B	.048	1.938	40.38	.227	4.729
4-A	.022	1.454	66.09	.175	7.954
4-B	.019	.886	46.63	.129	6.789
5	.055	1.77	32.18	.113	2.054
6	.220	6.06	27.55	.716	3.255
7	.094	3.07	32.66	.416	4.426
8	.109	4.05	37.16	.379	3.477
9	.313	11.25	35.94	.949	3.032
10	.100	2.90	29.00	.254	2.540
11	.089	5.97	67.08	.377	4.236
12	.092	4.67	50.76	.570	6.196
13	.484	10.40	21.49	.102	.211
14	1.53	72.001	47.06	3.002	1.962
15	.136 ^{2/}	1.50	11.03	.071	.522
16	.239 ^{2/}	.68	2.85	.012	.050

Excluding runoff and sediment yield from auxiliary watershed.

Drainage area approximate. To be recomputed at a later date.

Table 3.--Runoff, Badger Wash
Observation Reservoir 1A

Location.--Lat $39^{\circ}20'$, long $108^{\circ}56'$, in sec. 24, T. 8 S., R. 104 W.,
near Mack, Mesa Co., Colo.

Drainage area.--0.066 sq mi (42 acres).

Records available.--April 1954 to November 1965, summer months only.

Gage.--Water-stage recorder. Elevation of gage 5,058.08 ft above mean
sea level.

Runoff and discharge determination.--Contents of reservoir and volume
of inflow computed from a stage-capacity curve of the reservoir.

Capacities.--At spillway level (gage-ht of 54.7 ft):

December 1953 - 8.10 acre-ft
July 1955, November 1956 - 7.39 acre-ft
October 1957, November 1958 - 7.15 acre-ft
November 1959 - 6.85 acre-ft
November 1961 - 6.50 acre-ft
November 1962 - 6.42 acre-ft
November 1963 - 6.37 acre-ft
November 1964 - 6.33 acre-ft
November 1965 - 5.88 acre-ft

Maxima.--Maximum storm inflow 3.27 acre-ft, 49.5 acre-ft per sq mile,
July 25, 1955.

Remarks.--Records good.

Storm runoff, April 1 to November 3, 1965

Date	Precipitation (inches)	Inflow		
		Acre-ft	Acre-ft per sq mile	Inches
July 10	0.50	0.67	10.15	0.191
12	.68	1.74	26.36	.497
Aug. 13	.21	.10	1.52	.029
Sept. 29	.20	.24	3.64	.069
Oct. 16	.67	.91	<u>13.79</u>	<u>.260</u>
Total		3.66	55.46	1.046

Table 3.--Runoff, Badger Wash--Continued
Observation Reservoir 1B

Location.--Lat $39^{\circ}20'$, long $108^{\circ}56'$, in sec. 25, T. 8 S., R. 104 W.,
near Mack, Mesa Co., Colo.

Drainage area.--0.084 sq mi (54 acres).

Records available.--April 1954 to November 1965, summer months only.

Gage.--Water-stage recorder. Elevation of gage is 5,023.92 ft above
mean sea level.

Runoff and discharge determinations.--Contents of reservoir and volume
of inflow computed from a stage-capacity curve of the reservoir.

Capacities.--At spillway level (gage-ht of 19.5 ft):

December 1953 - 19.8 acre-ft

July 1955, November 1956 - 19.2 acre-ft

October 1957, November 1958, November 1959 - 19.1 acre-ft

November 1961 - 18.7 acre-ft

November 1962 - 18.6 acre-ft

November 1963 - 18.5 acre-ft

November 1964 - 18.5 acre-ft

November 1965 - 18.2 acre-ft

Maxima.--Maximum storm inflow volume 3.30 acre-ft, 39.3 acre-ft per
sq mile, July 25, 1955.

Remarks.--Records good.

Storm runoff, April 1 to November 3, 1965

Date	Precipitation (inches)	Inflow		
		Acre-ft	Acre-ft per sq mile	Inches
July 10	0.48	0.34	4.05	0.076
12	.78	1.49	17.74	.331
Aug. 13	.19	.02	.24	.004
Sept. 29	.20	.01	.12	.002
Oct. 16	.65	.68	8.10	.151
Total		2.54	30.25	.564

Table 3.--Runoff, Badger Wash--Continued
Observation Reservoir 2A

ation--Lat $39^{\circ}20'$, long $108^{\circ}57'$, in sec. 36, T. 8 S., R. 104 W.,
near Mack, Mesa Co., Colo.

inage area--0.167 sq mi (107 acres).

ords available--April 1954 to November 1965, summer months only.

e--Water-stage recorder. Elevation of gage is 4,946.43 ft above
mean sea level. Reservoir of side drainage in same watershed
equipped with reference mark, crest stages noted. Elevation of
reference mark is 4,940 ft (from topographic map).

off and discharge determinations--Contents of reservoirs and volume
of inflow computed from a stage capacity curve of the reservoir.

acities--At spillway level.

<u>Main reservoir</u>	<u>Auxiliary reservoir</u>
Dec. 1953 - 6.34 acre-ft	Dec. 1953 - 6.14 acre-ft
July 1955, Nov. 1956 - 4.42 acre-ft	July 1955, Nov. 1956, Oct. 1957, Nov.
Oct. 1957, Nov. 1958 - 3.93 acre-ft	1958 - 5.71 acre-ft
Nov. 1959 - 3.72 acre-ft	Nov. 1959 - 5.61 acre-ft
dam raised Nov. 1959	July 1962 - 5.55 acre-ft
Nov. 1959 - 15.08 acre-ft	Nov. 1963 - 5.49 acre-ft
Nov. 1961 - 13.86 acre-ft	Nov. 1964 - 5.31 acre-ft
Nov. 1962 - 13.70 acre-ft	Nov. 1965 - 5.18 acre-ft
Nov. 1963 - 13.53 acre-ft	
Nov. 1964 - 12.40 acre-ft	
Nov. 1965 - 12.07 acre-ft	

ima--Maximum storm inflow volume 7.71 acre-ft, 46.2 acre-ft per
sq mile, July 25, 1955. Inflow lasted 50 minutes.

arks--Records good.

Storm runoff, April 1 to November 3, 1965

ate	Precipitation (inches)	Inflow		
		Acre-ft	Acre-ft per sq mile	Inches
July 10	0.48	.90	5.39	0.101
12	.65	3.07	18.38	.344
13	.17	.44	2.63	.049
17	.14	.01	.06	.001
29	.19	.29	1.74	.033
16	.77	1.70	10.18	.191
total		6.41	38.38	.719

Table 3.--Runoff, Badger Wash--Continued
Observation Reservoir 2B

Location.--Lat $39^{\circ}20'$, long $108^{\circ}57'$, in sec. 25, T. 8 S., R. 104 W.,
near Mack, Mesa Co., Colo.

Drainage area.--0.158 sq mi (101 acres).

Records available.--April 1954 to November 1965, summer months only.

Gage.--Water-stage recorder. Elevation of gage is 4,970 ft above mean
sea level.

Runoff and discharge determinations.--Contents of reservoir and volume
of inflow computed from a stage capacity curve of the reservoir.

Capacities.--At spillway level.

December 1953 - 8.45 acre-ft

July 1955, November 1956, October 1957, November 1958 - 6.05 acre-ft
Dam raised

June 1959 - 24.8 acre-ft

November 1959 - 24.5 acre-ft

November 1961 - 23.8 acre-ft

November 1962 - 23.6 acre-ft

November 1963 - 23.5 acre-ft

November 1964 - 23.0 acre-ft

November 1965 - 22.7 acre-ft

Maxima.--Maximum storm inflow volume 6.29 acre-ft, 39.8 acre-ft per
sq mile, July 25, 1955. Inflow lasted 90 minutes.

Remarks.--Records good.

Storm runoff, April 1 to November 3, 1965

Date	Precipitation (inches)	Inflow		
		Acre-ft	Acre-ft per sq mile	Inches
July 10	0.47	0.51	3.23	0.061
12	.57	2.39	15.13	.284
Aug. 13	.17	.16	1.01	.019
Sept. 17	.12	.01	.06	.001
29	.20	.11	.70	.013
Oct. 16	.71	1.13	7.15	.134
Total		4.31	27.28	.512

Table 3.--Runoff, Badger Wash--Continued
Observation Reservoir 3A

Location.--Lat $39^{\circ}20'$, long $108^{\circ}56'$, in sec. 25, T. 8 S., R. 104 W., near Mack, Mesa Co., Colo.

Drainage area.--0.059 sq mi (38 acres).

Records available.--April 1954 to November 1965, summer months only.

Gage.--Water-stage recorder. Elevation of gage 5,033.68 ft above mean sea level.

Runoff and discharge computations.--Contents of reservoir and volume of inflow computed from a stage capacity curve of the reservoir.

Capacities.--At spillway level.

December 1956 - 12.90 acre-ft
July 1955, November 1956 - 12.63 acre-ft
October 1957, November 1958 - 12.53 acre-ft
November 1959 - 12.32 acre-ft
November 1961 - 12.12 acre-ft
November 1962 - 12.03 acre-ft
November 1963 - 12.00 acre-ft
November 1964 - 11.97 acre-ft
November 1965 - 11.53 acre-ft

Maxima.--Maximum storm inflow volume 2.98 acre-ft, 50.5 acre-ft per sq mile, July 25, 1955.

Remarks.--Records good.

Storm runoff, April 1 to November 3, 1965

Date	Precipitation (inches)	Inflow		
		Acre-ft	Acre-ft per sq mile	Inches
July 10	0.35	0.22	3.73	0.069
12	.67	1.36	23.05	.429
18	.16	.05	.85	.016
24	.26	.08	1.36	.025
Aug. 13	.23	.17	2.88	.054
Sept. 17	.24	.10	1.69	.032
18	.51	.05	.85	.016
29	.19	.12	2.03	.038
Oct. 16	.62	.56	9.49	.177
Total		2.71	45.93	.856

Table 3.--Runoff, Badger Wash--Continued
Observation Reservoir 3B

Location.--Lat $39^{\circ}20'$, long $108^{\circ}56'$, in sec. 25, T. 8 S., R. 104 W.,
near Mack, Mesa Co., Colo.

Drainage area.--0.048 sq mi (31 acres).

Records available.--April 1954 to November 1965, summer months only.

Gage.--Water-stage recorder. Elevation of gage is 5,013.80 ft above
mean sea level.

Runoff and discharge determinations.--Contents of reservoir and volume
of inflow computed from a stage-capacity curve of the reservoir.

Capacities.--At spillway level.

December 1953 - 8.10 acre-ft
July 1955, November 1956 - 7.69 acre-ft
October 1957, November 1958 - 7.65 acre-ft
November 1959 - 7.52 acre-ft
November 1961 - 7.38 acre-ft
November 1962 - 7.16 acre-ft
November 1963 - 6.99 acre-ft
November 1964 - 6.97 acre-ft
November 1965 - 6.74 acre-ft

Maxima.--Maximum storm runoff volume 2.35 acre-ft, 49.6 acre-ft per
sq mile, July 25, 1955.

Remarks.--Records good.

Storm runoff, April 1 to November 3, 1965

Date	Precipitation (inches)	Inflow			Inches
		Acre-ft	Acre-ft Per sq mile		
July 10	0.45	.14	2.92		0.036
12	.69	1.00	20.83		.362
18	.17	.06	1.25		.015
24	.27	.04	.83		.010
Aug. 13	.22	.10	2.08		.026
Sept. 17	.24	.04	.83		.010
18	.45	.06	1.25		.015
29	.21	.06	1.25		.015
Oct. 16	.65	.45	9.38		.116
Total		1.95	40.62		.605

Table 3.--Runoff, Badger Wash--Continued
Observation Reservoir 4A

Location.--Lat $39^{\circ}19'$, long $108^{\circ}56'$, sec. 36, T. 8 S., R. 104 W.,
near Mack, Mesa Co., Colo.

Drainage area.--0.022 sq mi (14 acres).

Records available.--April 1954 to November 1965, summer months only.

Gage.--Water-stage recorder. Elevation of reference mark is 4,944.83
ft above mean sea level.

Runoff and discharge determinations.--Contents of reservoir and volume
of inflow computed from a stage-capacity curve of the reservoir.

Capacities.--At spillway level.

December 1953 - 3.05 acre-ft
July 1955, November 1956 - 2.60 acre-ft
October 1957, November 1958 - 2.39 acre-ft
November 1959 - 2.33 acre-ft
November 1961, November 1962 - 2.10 acre-ft
November 1963 - 2.05 acre-ft
November 1964 - 1.90 acre-ft
November 1965 - 1.72 acre-ft

Maxima.--Maximum storm inflow volume, 1.20 acre-ft, 54.5 acre-ft per
sq mi, July 25, 1955. Inflow lasted 45 minutes.

Remarks.--Records good.

Storm runoff, April 1 to November 3, 1965

Date	Precipitation (inches)	Inflow		
		Acre-ft	Acre-ft per sq mile	Inches
July 10	0.44	0.22	10.00	0.189
12	.65	.80	36.36	.686
Aug. 13	.27	.13	5.91	.111
Oct. 16	.66	.30	13.64	.257
Total		1.45	65.91	1.243

Table 3.--Runoff, Badger Wash--Continued
Observation Reservoir 4B

Location--Lat $39^{\circ}19'$, long $108^{\circ}56'$, in sec. 36, T. 8 S., R. 104 W.,
near Mack, Mesa Co., Colo.

Drainage area--0.019 sq mi (12 acres).

Records available--April 1954 to November 1965, summer months only.

Gage--Water-stage recorder. Elevation of reference mark is 4,969.96
ft above mean sea level.

Runoff and discharge determinations--Contents of reservoir and volume
of inflow computed from a stage-capacity curve of the reservoir.

Capacities--At spillway level.

December 1953 - 4.52 acre-ft
July 1955, November 1956 - 4.24 acre-ft
October 1957, November 1958 - 4.16 acre-ft
November 1959, November 1961 - 4.11 acre-ft
November 1962 - 4.09 acre-ft
November 1963 - 4.05 acre-ft
November 1964 - 3.98 acre-ft
November 1965 - 3.85 acre-ft

Maxima--Maximum inflow 48.0 cfs, 5:45 pm, July 25, 1955. Maximum
storm inflow volume 0.77 acre-ft, 40.5 acre-ft per sq mi, July 25,
1955.

Remarks--Records good.

Storm runoff, April 1 to November 3, 1965

Date	Precipitation (inches)	Inflow		
		Acre-ft	Acre-ft per sq mile	Inches
July 10	0.46	0.10	5.26	0.10
12	.71	.50	26.32	.50
Aug. 13	.26	.07	3.68	.07
Oct. 16	.72	.21	11.05	.21
Total		.88	46.31	.88

EXPLANATION

R.104 W. R.103 W.

Recording rain gage,
tipping bucket

Recording rain gage,
weighing type

Reservoir gage,
recording

Reservoir gage,
non-recording



Base map prepared by G.C. Lusby from aerial photographs of US Department of Agriculture and land plots of the Department of Interior

MAP OF BADGER WASH COOPERATIVE STUDY AREA, COLORADO, SHOWING HYDROLOGIC NETWORK

EXPLANATION

(3) Recording rain gage, tipping bucket

(4) Recording rain gage, weighing type

▲ Reservoir gage, recording

△ Reservoir gage, non-recording

X—Y Erosion measurement course

(5) Drainage basin number

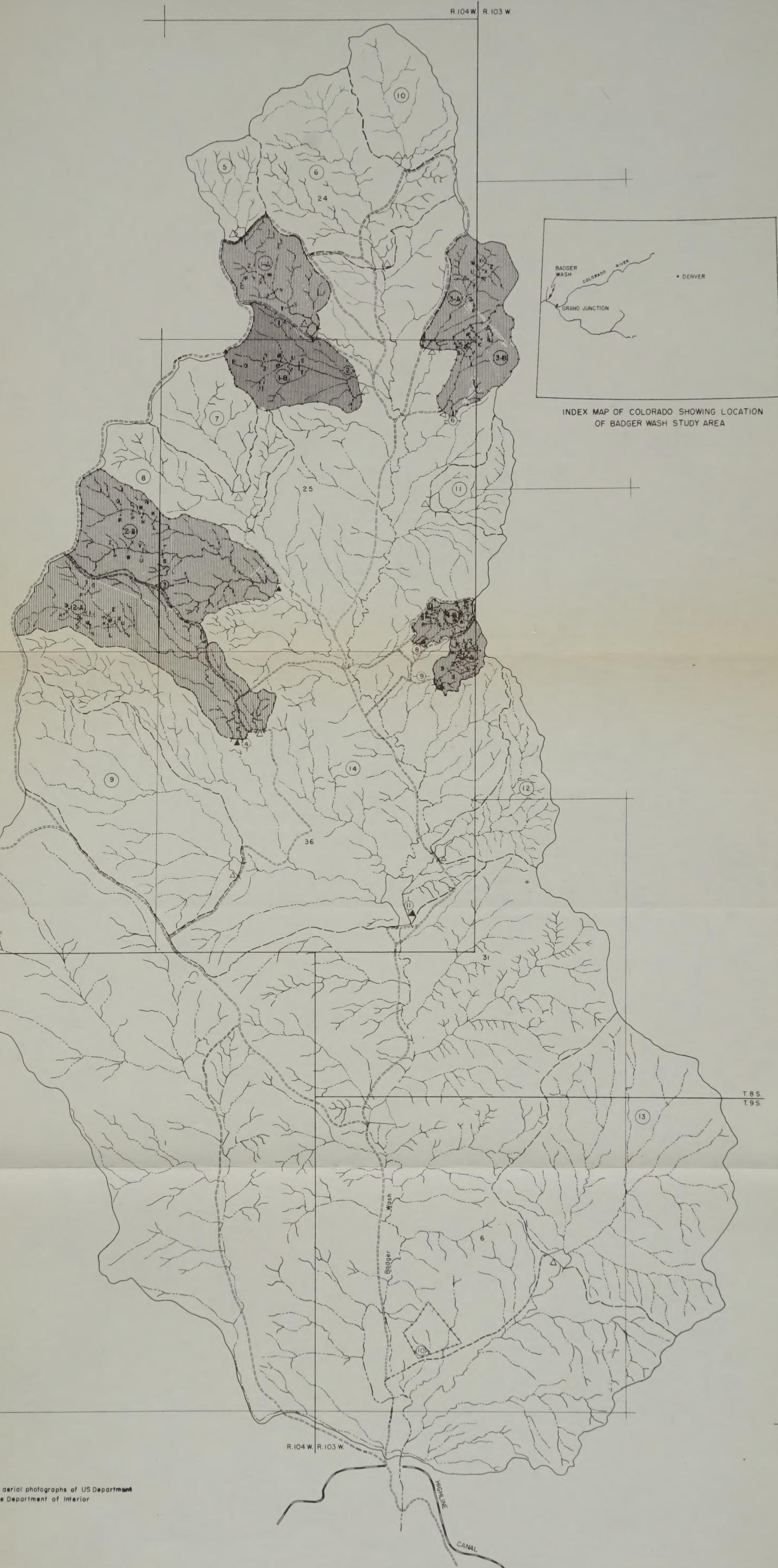
Paired observation area

Unimproved road

Fence

—X—X— Fence on watershed divide

Watershed divide



Base map prepared by G.C. Lusby from aerial photographs of US Department of Agriculture and land plots of the Department of Interior

MAP OF BADGER WASH COOPERATIVE STUDY AREA, COLORADO, SHOWING HYDROLOGIC NETWORK

1/4 0 1 Mile

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